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Native Seed Stakeholders Meeting

March 13, 2019

At the UNI Center for Energy and Environmental Education

Summary Report

Prepared by Laura Fischer Walter, April 11, 2019



Tallgrass Prairie
— CENTER —

UNIVERSITY OF NORTHERN IOWA

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Disclaimer: The following summaries are not word-for-word transcripts of what was said at the meeting but are derived from memory and notes taken by meeting participants and observers. Information in square brackets was added by the preparer (LFW) to provide context or definitions or to address some unanswered questions that were brought up in discussion. Please contact Laura Fischer Walter (laura.walter@uni.edu) if you notice errors or omissions in any part of this report.

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Host – The Tallgrass Prairie Center

The Tallgrass Prairie Center (TPC) is a part of the College of Humanities, Arts and Sciences at the University of Northern Iowa. Our mission is to restore native vegetation for the benefit of society and the environment through research, education, and technology. TPC staff work toward this mission through the activities of four key programs: Integrated Roadside Vegetation Management (IRVM), Research and Restoration, Prairie on Farms, and Plant Materials.

The meeting was held on Wednesday, March 13, 2019 at the Center for Energy and Environmental Education on the UNI Campus.

Acknowledgments

Funding for this meeting was provided by the Living Roadway Trust Fund (LRTF). The LRTF was established by the Iowa Legislature in 1988 to fund research, demonstration projects, monitoring, and education in support of establishing and maintaining native vegetation along roadside rights-of-way.

UNI students and staff provided invaluable assistance in planning, preparing for, and organizing this meeting.

We are very grateful to all meeting participants for listening and sharing their time and ideas toward the common goal of a healthy, viable native seed marketplace.

Attendees

Participants included diverse stakeholders in the native seed supply chain – native seed producers, ecological restoration professionals, regulators, conservation planners, researchers, scientific staff at government agencies, and purchasers of native seed at a variety of scales. There was a total of forty-six attendees from Iowa and neighboring states (Minnesota, Wisconsin, and Illinois). In addition to invited participants, the TPC director and six staff members participated in organizing the meeting.

See [Appendix A](#) for a list of attendees.

Introduction and Objectives

Based on introductory remarks by Laura Jackson, TPC Director

The purpose of this meeting was to convene stakeholders – to bring together knowledgeable people invested in the native seed industry to work out solutions to pressing problems. This fits the mission of the TPC through our interest in supporting high quality restoration projects that “save all the cogs and wheels” by capturing and propagating the species and genetic diversity of remnant prairies.

Today in Iowa, the Conservation Reserve Program (CRP) is the biggest program using native plant materials, followed by the Department of Transportation. Early in its history, CRP plantings were not seen as an opportunity for ecological restoration. Few species of native seeds were available, and CRP fields were mostly monocultures of switchgrass cultivars or brome or other non-native plants that provided erosion control but few other ecosystem services.

There has been a gradual improvement in the diversity of native species used in CRP, beginning with an increased number of grass species and incorporating more forbs over time. This would not have been possible without scaling up the supply of native prairie seed. The catalyst for the growth of the native seed industry in the state of Iowa was the adoption of Integrated Roadside Vegetation Management by the State Legislature in 1988. Sixty percent of the public land in Iowa is in the form of roadside rights-of-way. The DOT, TPC, and the Iowa Crop Improvement Agency worked together to establish a yellow tag certification program for source-identified native seed. Seed producers using either Iowa Ecotype Project foundation seed from the TPC or seed hand-collected from remnants ensured that Iowa-ecotype seed would be available for restoring Iowa roadsides. CRP projects have benefitted from the availability of diverse Iowa source-ID seed, even though they do not require the yellow tag, and the demand for CRP seed mixes has, in return, helped to sustain the native seed industry.

The rapid, large-scale roll-out of the new CRP Pollinator Habitat Practice (CP-42) happened through a “perfect storm”: the release of Obama’s Presidential Memorandum on Pollinators in the context of falling crop prices and aging land owners. In Iowa, more than 230,000 acres of CP-42 were planted over three years (2015-2017). CP-42 specified, among other things, that the seed mix must include at least three species of forbs that bloom in each part of the growing season – early, middle, and late. This resulted in an outpouring of demand for native seed, overwhelmed the supply, and led to both successful plantings and “bad mixes” that exploited loopholes in the practice specifications and affected the public image of prairie restoration and CRP. We learned in real-time how conservation programs, implementation, native seed producers, seed testing labs, certifying agencies, and consumers are connected. We learned that policy changes in one program have ripple effects on other parts of the system.

Our purposes for convening were:

1. To better understand how the native seed system responds to changes in demand
2. To identify practices that support stable availability, price, and quality of native seed
3. To prepare a list of recommendations for policy- and rule-making to support effective implementation as new CRP is rolled out
4. To build connections for productive collaboration and ongoing communication

Panel Discussion

Alan Lange – Resource Conservationist on the Ecological Sciences and Conservation Planning Staff in Des Moines and Iowa NRCS Conservation Reserve Program Manager

During the Pollinator CRP boom, CP-42 was in high demand for CRP. Customers could gain points on their applications for using pollinator mixes, and rental rates were high. One challenge was for the NRCS to coordinate needs between customers and the seed industry. In the first year, before NRCS had clear guidance in place, 140,000 acres went in to CP-42. Another major challenge was converting expiring CRP planted in non-native cool season grasses to pollinator habitat. At the time, NRCS did not have good approaches for this.



Figure 1. Five panelists, representing different stakeholder groups, presented their perspectives on successes and challenges due to the “Pollinator CRP boom.”

Now that pollinator habitats are established, the public is able to see the results and enjoy native plants in the agricultural landscape. Maintenance is the next concern they want to address. In the past, CP-25 (Rare and Declining Habitat practice) often reverted to grass-dominated stands. NRCS wants to know the minimum management needed to maintain diversity and functions of pollinator plantings. A new question is how to deal with the large number of re-enrollments anticipated in 2026.

Matt O’Connor – Pheasants Forever, Habitat Forever Coordinator

Iowa doesn’t have a prairie heritage or culture like Nebraska or Kansas, where prairie is part of the working landscape. In CRP, there’s a different worldview. These are 10-15 year projects and not true restorations. When CP-25 first came out in the mid-1990s, there was a scare about adding so many forbs. Good ideas come from the bottom up, from local chapters up through the chain to Soil and Water Conservation Districts and the FSA.

The Western Seed Association wants to get rid of the current mix and reduce the diversity to nine species. The response to the introduction of Palmer amaranth in native seed mixes was an overreaction, since it does not persist in competition with native perennials and is not likely to be a serious weed issue this far north. CP-42 is “the best habitat we’ve put out there for CRP.” We should be proud of what we are doing in Iowa.

Jim Rouse – Executive Director, Iowa Crop Improvement Association

Iowa Crop Improvement Association certifies source-ID native species through the yellow tag program. This makes up only about 1% of their annual business and is a money-losing program that is subsidized by corn. ICIA is a nonprofit business that needs to stay in budget. For yellow tag to be viable, the program is going to have to change. When it was originally set up, the thought was that the demand and market for yellow tag seed would increase beyond the DOT, but that is not what they’ve seen.

The impact of the CP-42 boom on the yellow tag program was indirect. They were fielding calls about Palmer amaranth in conservation plantings, even though the seed mixes that were involved were not from the yellow tag program. What this showed was that the yellow tag program does not exist in a vacuum. Making it work is going to take help from native seed consumers.

Seana Godbold – Chief Landscape Architect, Office of Design, Iowa Department of Transportation

The Iowa DOT uses native species to meet goals of reducing mowing and herbicide use. They expect their plantings to last indefinitely and to outlast our lives. They saw yellow tag as a way to get quality seed for long-term plantings. IDOT values yellow tag and wants the program to persist. They want to maintain quality as defined by seed genetics and pure live seed.

There are now nearly 55,000 acres of state and federal roadsides in Iowa that are planted with native species, and over the last ten years about 2,000 new acres have been planted per year. Along Highway 20, there are 40 miles of native seeding scheduled for planting this year. The quantity of seed used per year has lessened as they have moved from 2-lane to 4-lane developments, and the economic crash in 2008 also caused a decline in seed purchases. They recognize that seed purchases need to be more stable and consistent from year to year.

Engineers rely on native plantings for site stabilization. The planning process starts about 5-10 years before a project is completed. Once a site is graded, and erosion control structures are in place, it has to be planted. There is no room for flexibility in the timing. The DOT did not anticipate the huge drive for pollinator CRP habitat, and the tight supply and high prices of seed that resulted were a source of stress for them.

Aaron Corbin – Sales Manager, Hoksey Native Seed

The native seed industry is challenging, with intricate connections between harvesting, production, marketing, etc. Hoksey Native Seed has been producing seed for twenty years and developed much of their own foundation seed from an on-farm remnant prairie.

Before the CRP boom, production of yellow tag seed was able to keep up with demand, and Hoksey outsourced only a few species in their mixes. During the Pollinator CRP boom, the demand exceeded their expectations, and they had to outsource nearly everything. It is a huge struggle to build good mixes but have them also be competitive. On the other hand, it was exciting to see growth and increased demand, which enabled them to expand production into a number of new species. They see success in the sheer numbers of locally sourced seeds that are put in the ground.

Growers see a need for improved communication across the supply chain. They need to know what's coming up and what the parameters will be for seed mixes. This would help them anticipate spikes in demand. It would help even if they could be notified at the beginning of the year.

Whole group discussion of questions from participants

Much of the discussion was focused on clearing up misconceptions and answering questions concerning yellow tag certification of source-ID native seed in Iowa. The yellow tag program at ICIA is under the oversight of the Association of Official Seed Certifying Agencies (AOSCA), but it varies from state to state. Not all states have a yellow tag program, and it is not government-funded.

Iowa Crop Improvement Association is not a government agency; it's a small nonprofit business. Their funding is from payments for the services they provide. They work primarily with grain crops and provide education, research, and assistance to the seed industry. ICIA's role in the yellow tag program is to certify that customers purchasing Iowa-source seed are getting what they paid for. Most of the cost of the yellow tag program is staff time and travel for field inspections.

ICIA was not directly impacted by the CRP boom. They received numerous complaints about Palmer amaranth even though yellow tag seed was not the source. The increased scrutiny caused the ICIA Board to take a look at their yellow tag program, and they found a need to improve and strengthen it. Many consumers who want Iowa-origin seed trust growers to honestly report the source and do not ask for yellow tag certification.

When the program was started, the assumption was that the consumer demand for yellow tag seed and producer participation would expand over time. This is not what ICIA has seen. They have never had more than 12 producers in the program. In recent years, only four growers still certify their seed, and the Iowa DOT is the only consistent consumer for yellow tag. Much of the native seed grown in Iowa could qualify for yellow tag certification, but is not being labeled as such, and this is a concern for them. ICIA would gladly hand the yellow tag program over to another entity.

Seed suppliers countered that changes to seed testing rules for the yellow tag program have made it nearly impossible for them to participate. In response to complaints about the introduction of Palmer amaranth, the ICIA no longer accepts seed test results from private seed testing labs. The list of approved seed testing labs has recently been expanded to seven university-based labs, all in the Midwest region.

Seed producers argue that state seed labs take much longer (2-3 months) to return results of germination tests. Producers are working with a tight timeline: they need to be able to harvest seed, get the test results, offer bids, and sell their product. Delays in testing are costly.

Both producers and consumers of seed are concerned about the reliability of seed testing for native species. Seed prices are strongly affected by the results of tests that determine Pure Live Seed (PLS), and these results are also important in developing seed mixes and determining seeding rates.

Seed analysts should follow testing rules set by the Association of Official Seed Analysts (AOSA), which helps to reduce variation and ensure reliability, but many native species are not yet in the rule books. There is a process for developing new rules, but it takes time. Analysts also vary in their degree of experience in working with wild species.

Anecdotal reports and informal tests show variability in test results both within and across seed labs. This suggests the need for a research project to systematically examine the variability in native seed testing. More objective information would help to inform this debate.

Another reason for the low proportion of native Iowa-source seed being sold with a yellow tag is that most native seed is sold as part of mixes. One grower reported that 80% of their retail sales are mixes. One solution that was suggested would be to allow labeling the percentage of yellow tag seed in a mix.

The CP-42 boom highlighted the relationship between different large-scale seed consumers – CRP and DOT – and the yellow tag program. The yellow tag program, the TPC's Natural Selections/Iowa Ecotype Project, and stable demand from the DOT helped establish a diverse native seed market in Iowa. Iowa native seed producers also sell seed in the broader market that is dominated by CRP. In 2015-16, most of the seed that was planted in Iowa CRP was Iowa-source (anecdotally), although it may not have been yellow-tagged. The diversity of Iowa-source seed available in the market allows consumers to try new mixes and results in better restoration outcomes in CRP.

Expanding consumer demand for yellow tag seed would require differentiating it from other similar products (cultivars and non-source-ID seed) through education and promotion. Consumers won't ask for yellow tag unless they know what sets it apart and why they should value it. Further education of conservation planners could help them better inform landowners about the value of source-ID seed.

Landowners may shy away from source-ID seed anyway if it isn't competitively priced. One participant said that it's like walking a tightrope – if specs are tightened and expenses increase, CRP participants will walk away from the program. It was suggested that the USDA could make it financially feasible for landowners to put yellow tag seed in the ground.

Breakout Sessions

Ensuring native seed quality without compromising availability and affordability

Facilitator: Laura Jackson, TPC Director

There was a preliminary, smaller meeting a few weeks before this one to hash out issues brought about due to ICIA changes in approved seed testing labs following the accidental introduction of Palmer amaranth. ICIA and the DOT were concerned about reliability of purity tests from private seed labs. Their initial reaction was to restrict testing for yellow tag seed to only the Iowa State University Seed Lab, then in April 2018 the Illinois Crop Improvement Association, South Dakota State University Seed Testing Lab, and Wisconsin Crop Improvement Association were added. Recently, Minnesota Crop Improvement Association, Indiana Crop Improvement Association, and North Dakota State Seed Department seed testing labs were added to the approved list.



Figure 2. Seed of swamp milkweed, Asclepias incarnata, in demand due to its role as larval host for the monarch butterfly

Growers are concerned about testing because it affects profitability. Consumers pay per unit Pure Live Seed (PLS). If a seed lot tests lower, then the profit from that lot is reduced, unless the price is raised. Producers had questions about the procedures for becoming a certified seed testing lab – who decides which labs are certified, and what are the certification requirements? [Note: The Association of Official Seed Analysts certifies analysts, not labs. Analysts must pass written and practical examinations in order to be registered.]

Both producers and consumers need consistency, but variability in seed testing results are a known concern, especially for wild species. One strategy used for dealing with testing variability is to send samples to three different labs and then use the two tests that are closer in value. The cost of testing and the scale of the business affect the ability to get multiple tests. Seed companies pay \$100-\$150 for testing each seed lot. When bidding, a grower can invest up to \$5,000 in seed tests and possibly not get the bid. These costs are built into the seed price and therefore affect seed affordability.

Seed suppliers can produce mixes with a range of price and quality. Typical CRP mixes are priced at around \$100-\$150 per acre, while a “nice mix” for ecological restoration would be around \$500 per acre.

There are different approaches to obtaining PLS estimates for native seed. ICIA and Iowa DOT require a germination test followed by tetrazolium (TZ) to determine if ungerminated seeds are dormant. Complete germination tests can take up to 3-4 months (partly due to dormancy-breaking procedures), compared with around 3 weeks for TZ tests. Allowing TZ testing rather than germination+TZ for PLS determination would help solve issues of timing for growers.

One possible compromise on the seed testing issues would be to separate the different components of seed quality: geographic source-ID, purity, and viability. Different labs could be used to obtain the most consistent, reliable, and expeditious results for purity or viability. One seed producer argued that the

yellow tag program should be concerned only with source-identification. The more constraints are placed on a bid, the more the seed will cost.

The large consumers of seed in Iowa – the DOT and CRP – are interconnected with the yellow tag program. The presence of the broader market (CRP) helps native seed growers, in return, by giving them different outlets for selling seed. The DOT has an interest in making sure that there are enough companies to provide the diverse species of yellow tag seed they need. However, DOT requirements are preventing some growers from bidding.

One grower pointed out that just growing more seed and having more seed producers in the market will not solve problems with availability of affordable, quality seed. The bidding process also needs to be improved. Improving communication with growers regarding bid releases and a longer window from bid release to bid letting would increase the species diversity available and help control prices. If the bid is released too early to test, however, it boosts the price of seed, because companies have to ball-park their estimates. The DOT's perspective is that they have to operate on a strict timeline and set high standards, since they have "one shot to get it into the ground."

One producer questioned the rationale behind the three geographic zones in the Iowa yellow tag program and asked about the scientific research supporting that approach. The intent is to capture and sustain the genetic diversity of native plant populations remaining in the state by developing foundation seed and encouraging production and use of Iowa source-ID seed. This is a value to the public in that it preserves the natural heritage of the state and creates a "gene bank on the roadsides."



Figure 3. The three latitudinal zones used in the Iowa Ecotype Project

[Note: For some species, there is evidence of phenological variation along a latitudinal gradient, so there is biological justification for the north-central-south zones, although defining them by county boundaries was somewhat arbitrary. This could be a topic for follow-up discussion.]

Understanding the native seed supply chain to improve coordination and market forecasting

Facilitator: Kristine Nemec, TPC IRVM Program Manager

This breakout session used a simple conceptual model of the native seed supply chain as a starting point for developing a better understanding of the whole system.

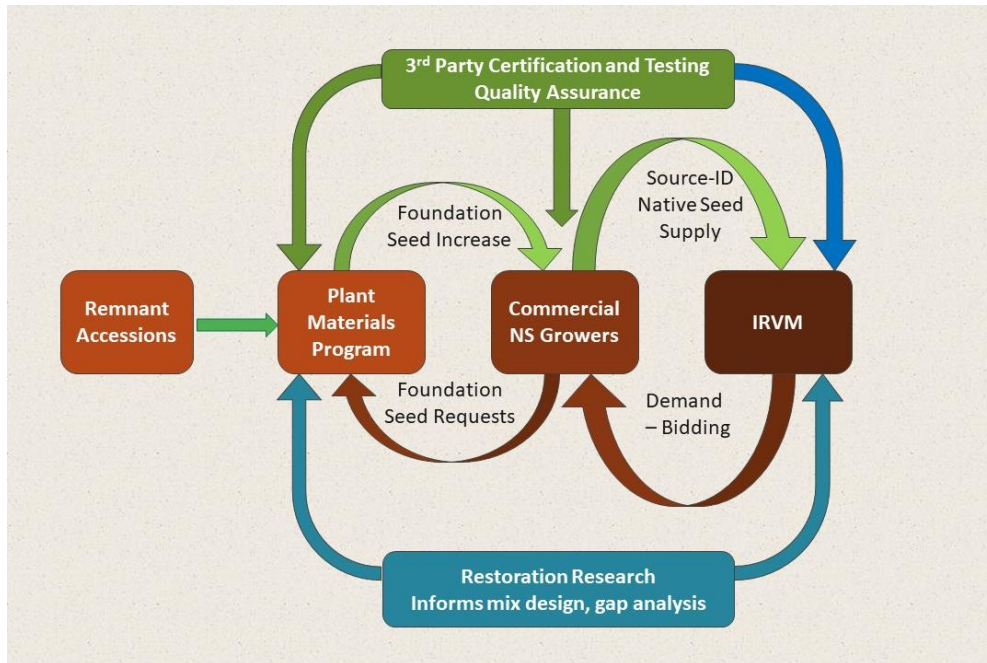


Figure 4. Model of the native seed supply chain from Iowa remnant prairies to the DOT, as seen from the TPC perspective

Walkthrough of the initial supply chain model

1. The starting point (Figure 4, on the left) is seed collected from native prairie remnants.
2. Seed collected from several remnants in one of three Iowa zones (north, central, south) is grown out in an increase plot by the Plant Materials Program at the Tallgrass Prairie Center.
3. Seed harvested from TPC production plots is provided as foundation seed to commercial native seed growers. (TPC does not sell seed to the public.)
4. Native seed producers grow seed for sale. Seed grown from TPC foundation seed is eligible for certification as yellow tag seed, if growers follow the requirements for record keeping, seed testing, and field inspections set by the Iowa Crop Improvement Association (ICIA).
5. Sometimes, native seed growers see potential demand for a species and request that the TPC develop it for production.
6. Growers sell seed to consumers that request it, such as the Iowa DOT and its Integrated Roadside Vegetation Management Program for federal and state highways.
 - a. With IRVM, the DOT manages roadsides ecologically: planting native species, reducing mowing, and reducing herbicide use.
 - b. Entities other than Iowa DOT have been known to practice IRVM: utility companies, cities, county and state agencies.

- c. The original intent of the TPC Iowa Ecotype Project/Natural Selections (now part of the Plant Materials Program) was to help meet the DOT's demand for high quality, regionally appropriate native prairie seeds by supporting a competitive, private native seed industry.
 - i. The latitudinal zones (north, central, and south) were drawn in response to research showing that prairie plants vary along latitudinal gradients in traits such as flowering phenology.
 - ii. Pooling accessions of a species from several remnant prairies across a zone was seen as a means for maximizing the potential genetic diversity and regional adaptations in the foundation seed.
- 7. Growers also sell seed produced from TPC foundation seed or other documented remnant sources to other consumers (e.g., for CRP plantings on private land) who may or may not request yellow tag certification.
 - a. Other consumers should be added to the model, because native seed growers respond to demand from anyone who is buying their seed, and competition among large consumers of seed (e.g., DOT and CRP) influences price and availability.
 - b. Other purchasers (or entities influencing purchasing decisions) include the NRCS-CRP, municipalities, county conservation boards, Army Corps of Engineers, restoration service providers, NGOs and land trusts, and individual landowners.
- 8. The model needs to reflect the lag time between the flashy, fluid demand for seed and the time it takes to develop mixes and ramp up production.

For an updated version of the supply chain model, based on suggestions from meeting participants, see [Appendix B](#).

Local ecotype seed, the yellow tag program, and its value to consumers

One participant asked, "If we are confused over what the yellow tag program is, how are consumers supposed to understand what yellow tag means?" Yellow tag certification varies from state to state but is overseen by a national organization, the Association of Official Seed Certifying Agencies (AOSCA). The yellow tag program was introduced in Iowa (and administered by the ICIA) in order to provide third party certification of seed produced using either TPC foundation seed or growers' own remnant collections.

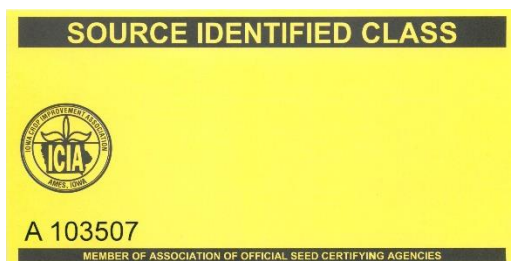


Figure 5. Example of a yellow tag issued by the Iowa Crop Improvement Association

The DOT was willing to support the program by paying more for yellow tag seed. Prior to the yellow tag program, the DOT purchased native plant seed from other states, much of it of unknown origin or varietal (cultivars) that grew differently in Iowa. The yellow tag program was introduced to certify seed originating from remnant prairies within three Iowa eco-zones, which would be regionally appropriate for restoration.

There is little demand for yellow tag by other native seed consumers, and as a result, commercial native seed growers may decide not to participate in the yellow tag program. There may need to be more

education on what yellow tag means, why local ecotypes have value, and how certification helps buyers to know what they are buying.

The largest native seed consumers in the state of Iowa are enrollees in CRP, and this program does little to encourage the use of local ecotypes or yellow tag seed. Their plantings are finite, most having a lifespan of no more than 10 to 20 years. Yellow tag is currently seen as being worth the investment only in longer term plantings such as those of the DOT.

Among consumers besides the DOT who demand local source seed, many trust the vendor without asking for proof of the seeds' origin. If customers are not demanding that seed be yellow-tagged, producers are unlikely to pay for certification. There is also trust at the level of agency oversight and inspection. Agencies need ways to objectively verify the source of the seed rather than trusting the seed producer to honestly report the geographic location of the remnant collection.

Meeting participants recognize that many native seed consumers do not really know where their seed originated. Getting more consumers, besides the Iowa DOT, to demand yellow tag certification is needed to address the issue of trust and ensure a stable supply of certified, source-identified seed.

This suggests a set of action steps: 1) Improve communication among stakeholders, 2) Improve the conceptual model for the native seed system to better understand the supply-demand relationships, 3) Carry out research to answer questions about demand for native seed: What motivates consumers – cost or other values? What do consumers understand about “seed quality?” and 4) Work on marketing and promoting yellow tag (certified source-identified seed) to seed consumers.

Improving the NRCS seeding plan development process

Facilitator: Alan Lange, NRCS State Office, with Jacob Groth, NRCS, and Kevin Anderson, IDNR

The Iowa NRCS developed a “seed team” to work on improving the seeding plan process. Iowa NRCS creates approximately 10,000 seeding plans annually. The current way of creating seeding plans has been working but could be improved.

Several weaknesses have been identified: 1) clients often purchase mixes different from what is in the plan and potentially not meeting standards; 2) seed plans that are on file may not accurately reflect what was actually planted, although some clients bring their new seed mix to the NRCS office; 3) discrepancies between the plan and planting make it hard to evaluate success; 4) rewriting plans after the fact and obtaining information on what was planted is extra work (inefficient); 5) gaps in communication from the NRCS employee to the client to the seed dealer may result in dealers supplying mixes that do not meet standard and program requirements; and 6) inconsistencies between county offices in how seeding plans are written and certified.



Figure 6. An establishing CRP planting

The NRCS seed team wants to develop a process that: improves accuracy, reduces re-work, reduces instances of seeding that do not meet practice standards and program requirements, communicates goals and objectives, is achievable, improves the client experience, improves consistency from office to office, reduces the complexity of writing a seeding plan and allows industry experts to assist, improves communication with the seed industry, allows conservation planners to apply their technical knowledge, and eliminates cases of conservation planners writing plans for clients that have little chance of being followed. When plans are written, planners need to know if the seeds are available on the market.

The seed team has recommended adding an addendum to the seeding plan to improve communication and accuracy. It would include contact information, including email, for NRCS field office personnel involved in writing the plan. There would be boxes to check to help NRCS staff understand the client’s goals and write a plan in accordance with them. They asked for the breakout group to discuss items that could be included in the addendum and seed plan to work toward the goals for improvement.

A major challenge is communicating with landowners about their goals and choices for CRP. Planners find that they sometimes have to “fish” for what the landowner really wants in the planting. The seed team is planning to add a space for comments on the addendum to allow clients to say what their program objectives are: for example, interest in pheasants or monarchs.

Communicating with clients about choices of practices that would meet their goals is another challenge. One suggestion was to use names that describe the practice (diversity, site, soils, and location) rather

than using the abbreviated practice codes like CP-25. According to one planner, asking for specifics like seeding dates and grass to forb ratios confuses some landowners. However, the NRCS perspective is that people need to know specifications when they sign up for a practice, so some of this is unavoidable. Having specifications such as seeding dates and grass-to-forb ratios included is also important when communicating with seed suppliers. This allows them to adjust mixes while staying in compliance with the specifications.

One participant stated that there is currently a lot of variation in client experiences working with different NRCS field offices, and he is glad that the state NRCS is aware of this. He thinks there needs to be more in-person communication or “tailgate planning” between planners and landowners. He suggested that interviews with clients would make it possible to figure out their goals and then collect more information about how they are going to execute plans. Some information he suggested collecting included whether they were planning on hiring a contractor to do the work, what kind of equipment would be used, and the timing of planting. This is not directly connected to the NRCS seed team’s work of improving the seeding plan process, but they recognize that it is a concern. They are focusing their efforts on the seeding plan, because they see it as a place where they can address technical difficulties and improve efficiency.

The NRCS seed team is trying to understand what seed dealers need to know when they fill out a mix for a client. The NRCS provides a seed calculator that aids in developing custom mixes and checking them against practice specifications. They asked for dealer feedback on it at the meeting. One dealer shared that he had made his own calculator. He thinks the NRCS seed calculator needs ‘sampling’ although it has been improved over time. The NRCS wants to provide more opportunities for training [for field office staff], so that it is clearer when variations to mixes are allowed and when they are not allowed.

Enabling direct communication between the seed supplier and the conservation planner would be a way to make the seed planning process more efficient. The NRCS field office contact information would be included in the addendum. The NRCS would like seed suppliers to use the NRCS calculator and email the actual mix directly to the NRCS office for review. This would eliminate field office staff time being used to re-enter seed mixes from paper copies in various formats. It would expedite the process and improve completeness and accuracy of records. It would not be mandatory for seed dealers to use the NRCS calculator and submit the seed mixes by email, however, the NRCS hopes that they gravitate to this way of doing things.

One seed supplier commented that the way the seed plan currently works, she does not know who the NRCS field office staff are, and often the clients also don’t know whom to contact either. From the client’s perspective, they just want the seed mix so that they can take it to the contractor. Some clients just want the cheapest mix and will go to a dealer who will give them that. Another seed dealer stated that connecting suppliers directly with the conservation planner puts more work on the dealer, when it is really the landowner’s responsibility to make sure what they plant meets the practice specifications. Dealers are also concerned with variability in the NRCS field office staff skills in using the calculator.

Some are even using outdated versions of the calculator. She suggested that field office staff need more training.

One participant suggested that the NRCS require landowners to turn in seed tags. This is a requirement from FSA but is not currently followed through in all cases. The state NRCS is planning on addressing this issue – seed quality – as a next step after improving the seed plan process. They have questions about the definition of seed quality and how to measure it: Is it based on the seed tag or seed analysis?

Another suggestion included gathering more information about management plans up front while working with clients to design the seed plan. For example, if mid-contract management will include burning, the seed mix needs to include enough grass to sustain a burn. Other participants suggested that seed bed preparation and establishment plans need work, since mid-contract management works only if the planting was established and maintained in the first five years. The state NRCS recognizes these issues and has new job sheets to help with establishment guidance.

Sharing best practices for meeting technical challenges in seed production

Facilitator: Laura Walter, TPC Plant Materials Program Manager

Producers expressed an interest in continued communication through various channels. In-person meetings are seen as a starting point. There is some tension between the desire for open sharing of ideas and improvement of practices, on the one hand, and protection of hard-won knowledge on the other. The competitive bid process creates a climate of secrecy rather than collaboration. However, some growers see potential for “lifting all boats” by sharing successful practices and thereby improving supply stability. Communication about which species are available for market could help growers make decisions about market gaps they could fill.

Some potential avenues for continued communication include the following:

- A periodic newsletter produced by the Tallgrass Prairie Center to highlight current issues affecting the native seed market (e.g., changes to government programs) and contributions from producers (e.g., production techniques, challenges, issues)
- An email listserv for native seed producers in Iowa and neighboring states
- YouTube Channel for sharing growing techniques; providing an added benefit for gardeners and other customers
- Revitalizing the Iowa Native Seed Growers Association – their role has primarily been to collaborate with the Iowa DNR and Pheasants Forever on the Prairie Partners program to provide discounts on native plant materials to Iowa landowners for qualified restoration projects. An expanded growers’ association could include producers in neighboring states of the Midwest.
- An online forum for discussion of issues related to production of native seed and plants, possibly hosted by the Tallgrass Prairie Center and modeled on AgTalk

Producers face a variety of challenges that they could collaboratively address. The following sections are key issues that were discussed.

Plot productivity and fertility decline over time

Grass plots remain productive for ten years or longer, but forbs tend to peak in year 2-4. Producers would be interested in sharing best practices for extending plot longevity and productivity. Many growers rotate plantings to maintain production over time. This requires a source of foundation seed. What is the source – remnant prairies, former production plots, or TPC Natural Selections foundation seed? If using former production seed, this increases the number of generations from remnant sources and increases the risk of unintended selection and loss of genetic diversity.

Pathogens, insects, and soil fertility declines were suggested as possible causes of productivity losses. These effects may



Figure 7. A production plot of meadow blazingstar, *Liatris ligulistylis*, at the Tallgrass Prairie Center

be intensified by growing native plants in monoculture stands. Intercropping and polyculture are practices that might avoid some of the negative impacts of monoculture plantings.

Fungicides were suggested as a way to increase seed production by reducing plant pathogens. Fungal pathogens are particular suspects in declining productivity of *Asclepias tuberosa* fields.

Some growers have tried using division or cultivation to break up large colonies of rhizomatous species (e.g., *Spartina pectinata*, *Coreopsis palmata*). These species have long-lived stands but produce little seed except along field/plot borders. Creating openings within the stand did not noticeably increase production.

Growers differ in their use of fertilizers to improve productivity, and native species vary in responses to fertilizer input. Timing, N-P-K ratios, and application rates vary depending on species, soils, and erodibility of sites. Fertilization can have negative effects such as “feeding the weeds” and causing lodging of seed stalks. For a tall *Liatris* species, one grower found that lodging due to fertilization actually improved the ease and efficiency of harvesting the fluffy seeds.

Research could aid in understanding the causes of productivity declines and suggest methods for extending productivity. One group member suggested that chemical companies might be interested in supporting research into native plant production but another countered that such support could be seen as “green-washing.”

Weed control

Weed control is important both for stand productivity and for prevention of weed contamination in harvested seed. Methods for weed control include mulches, cultivation, and herbicides.

Some species are poorly tolerant of cultivation. For example, *Liatris* spp tolerate cultivation in their first growing year but become susceptible to fungal disease if corms and shallow roots are damaged by cultivation in later growing seasons.

Most herbicides are not labeled for use with natives. Growers carry out small tests of herbicides to see which natives they are compatible with. Timing, rate of application, and soil type are considerations.

Reducing tillage could prevent bringing weed seed to the surface. Some growers are using sideoats grama (*Bouteloua curtipendula*), little bluestem (*Schizachyrium scoparium*), or sedges (*Carex* spp) as cover crops in forb production fields to compete with annual weeds, reduce the need for tillage, and enable the use of fire for weed control. This has worked for showy milkweed (*Asclepias speciosa*) and lupines (*Lupinus* spp).

There is little interest in or demand for organic native seed production, according to most of the growers at the table. Growers would need to charge a premium price for organic seed, but they see little market for it. Other producers see organic production as a way into the gardening market. Some buyers might see a conflict between chemical-intensive production methods and values of ecological restoration and protection of biodiversity. Growers who produce organic, potted native plants need a source of organically produced seed.

Conservative species and increasing the diversity of available species

It is expensive and time-consuming to collect remnant seed and develop protocols for producing new species. The Tallgrass Prairie Center has received past funding for identifying species gaps and

developing foundation seed of new Iowa ecotypes. This has expanded the diversity of native plant materials commercially available for roadsides and other restorations. In other states, the risk and expense of developing new species is born entirely by seed producers. If species are not profitable to produce, they drop out of the market.

One county in Minnesota has a citizen science project for crowd-sourcing the development of conservative species. Contributors provide documentation and photos of practices and outcomes. Using citizen science could be one way to increase available species.

Inconsistencies in germination and seed set

A germination protocol for a species may work one year, but then fail the next. This can be bewildering and costly. Complex dormancy mechanisms are a challenge.

Production for a species varies from year to year, likely due to interactions of weather, pathogens, competition, and pest species. Variation makes sense when seen from remnant prairie perspective – there's always something different that is productive each year.

Price setting

The competitive bid process makes it difficult to know how to set prices. There is a great deal of secrecy. The cost of production does not matter; the price is what you can get for the seed.

Promoting and marketing native plants

Engaging people in cities is a way to expand the market and increase public knowledge and acceptance of prairies. Anyone can grow native plants in their home landscape. Micro-prairies and Outdoor Learning Environments are current trends that could extend the customer base and public support for native plants. Giving seed balls and slingshots to students at schools is another way to increase interest in and awareness of native plants.

We need to find ways to counter common assumptions that native plants take over and look weedy. One grower has been involved with Iowa State University Extension's Women in Ag program and suggests reaching out to rural women to promote natives. Women farmers and farmers' wives can influence what goes into CRP mixes, especially if they gain experience growing attractive native flowers in their home landscape.

Keeping up with changes in demand

Government policies greatly influence the demand for native seed. Having better and earlier knowledge of upcoming changes would help producers meet demands. It is important to keep in mind that there is a lag time between learning of demand for a practice and being able to put together mixes and/or produce seed at scale. These are not common annual crops.

Connecting research and practice for establishing diverse, multifunctional plantings

Facilitator: Justin Meissen, TPC Research and Restoration Program Manager

There is a lot that we know and a lot that we don't know about planting highly diverse prairie. One member of the group stated that it is time to revisit how things have been done in prairie restoration for the past thirty years. There is little published research into the effectiveness of different practices, and what is published has left out the factor of cost.

When landowners make decisions about seed mixes for CRP plantings, cost is one of the biggest factors they consider. One native seed and service provider shared that some people put "junk seeds" in the mix to cut costs while still meeting program requirements. He also questioned the standard for planting 40 seeds per square foot. Other participants shared that this was a common practice that was done for the sake of cost but was not based on research.



Figure 8. Grasses and forbs flowering in the second year after planting

One challenge is communicating with farmers about practices that are more effective for conservation plantings using native species. Farm operators may expect native plants in CRP to act like an annual crop that is planted in the spring and is productive in the first growing season. It can be hard for farmers to accept advice on seeding practices or decide to hire someone else to do it for them.

In choosing seed mixes, the key is to be strategic rather than focusing on what seems cheapest. It is important to know the establishment rates for different species when determining planting densities. The plants you want to see on the land should drive the proportions of seeds in the mix.

Fall planting was suggested as a way to encourage establishment of prairie seedlings before annual weeds get started. Native cool season grasses such as Canada wildrye (*Elymus canadensis*) in fall plantings act as a cover crop and compete with undesired species.

One participant suggested that restorations should attempt to better replicate ecological systems. The Iowa NRCS is producing a set of "Ecological Site Descriptions," documents that provide detailed information on the topography, soils, hydrology, climate, plant communities, and land use history of particular land types. This information could be useful in making restoration decisions.

Another group member shared experiences of using a successional approach to prairie restoration. She burns and over-seeds existing plantings in successive years to increase diversity. The most disturbance-tolerant species (the last ones to disappear from disturbed remnants) are the first to come up in a planting, and subsequent seedings aid the establishment of more conservative species. A rule of thumb is "the last ones out are the first ones in."

To achieve a more ecological approach would require flexibility in planting and management. Some suggestions that were offered were: 1) extending site preparation of agricultural land to a year or two under a cover crop before seeding native plants; 2) planting in more than one year (successional approach); 3) adjusting seeding rates depending on the specific mix; and 4) adjusting the mixes, seeding

rates, and the timing of planting to fit conditions in a given year and the desired plant community, topography, soils, and hydrology of the site.

Summary of key points and questions:

- There are differences in goals and practices when considering conservation plantings on agricultural land versus ecological restorations on protected lands. However, both may contribute research questions and benefit from research outcomes.
- How can we define what is highly diverse or multi-functional? These terms are understood differently from different stakeholder perspectives.
- How does the timing of planting and the seeding rate affect seeding efficiency?
- How can we better communicate with farmers about successful practices for native plantings?
- How can we close loopholes in practice specifications to keep “junk seeds” from dominating mixes?
- How can we build flexibility into program requirements so that it would be possible to achieve greater efficiency and use a more ecological approach?
- How should we define functional groups for the development of seed mixes?
- How can we improve communication with farmers about effective restoration practices?
- Research into these topics and questions would give us more reliable information on which to base practices and specifications.

Synthesis of Outcomes

Revisiting purpose/objectives of the meeting

- To better understand how the native seed system responds to changes in demand
- To identify practices that support stable availability, price, and quality of native seed
- To prepare a list of recommendations for policy- and rule-making to support effective implementation as new CRP is rolled out
- To build connections for productive collaboration and ongoing communication

Collaborating to improve the system

The response to this meeting demonstrated that **there was an unmet need for coordination and communication within and among different parts of the native seed supply chain**. Lack of awareness of interconnections among native seed consumers contributes to demand spikes and fluctuations in price and quality in the native seed market. Bringing together groups who represent different parts of the supply chain promotes understanding of issues and development of creative solutions. An annual meeting would be one way to meet this need.

Communication among native seed suppliers

The diversity that we value in native species also makes for challenges in seed production. The availability and affordability of diverse native seed could be improved through **research into practices for increasing plot longevity and productivity and development of production methods for conservative species**.

Producers could benefit from sharing questions, challenges, and best practices with each other more frequently. They could connect online through an email listserv, remote meetings, and/or an online forum. Producers could form/join a regional native seed producers' association. The Tallgrass Prairie Center could have a role in facilitating communication among seed producers.

Producers need more timely information about policy changes that will impact seed demand and seed mix parameters. It takes time for growers to develop mixes that can meet specifications. Individual growers rarely produce all of the species needed for diverse mixes, and considerable exchange of seed among producers occurs before mixes become available on the retail market. Several years are often needed to establish commercial-scale production of new species. Policies that take these lag times into account will be more likely to support stable availability, price, and quality of native seed.

Promoting improved outcomes in conservation plantings and ecological restorations

The Pollinator CRP boom shined light on discrepancies between seeding plans, seed mixes that were planted, and records kept at field offices. **The Iowa NRCS is currently working on an addendum to the seed plan that would help to clarify landowner objectives, provide clear choices of practices to meet those objectives, and open up communication channels between seed suppliers and conservation planners.** The Iowa NRCS is encouraging seed suppliers to use the NRCS seed calculator and email the planned mix directly to the field office in order to improve efficiency of the planning process and help ensure that mixes meet specifications. Seed suppliers may be reluctant to comply with this request if it appears to shift the burden for program compliance to them rather than landowners.

In the future, the Iowa NRCS hopes to address issues of seed quality, landowner submission of seed tags, refinements to the seed calculator, and training of field office staff. A further suggestion was to collect more information up-front about how landowners will execute plans and manage plantings, to avoid mismatches between seed mixes, establishment practices, and planned mid-contract management.

Policy revisions should be based on reliable information from research into the outcomes of practices. Monitoring and evaluation of establishment is essential. The proportions of seeds of different species included in a mix should be based on known establishment rates. More flexibility in timing, seeding techniques, seeding rates, and site preparation in programs like CRP would allow for innovation. Systematic research on the effects of innovative practices could lead to policy recommendations. Cost effectiveness of seed mixes, seeding practices, and management of plantings is a primary concern for landowners. In order for policies to be implemented effectively, communication about effective restoration practices needs to reach farmers.

Evaluating seed quality

Different stakeholders place greater value on different components of seed quality: geographic source, viability, and/or purity. Growers, conservation planners, regulators, and consumers of seed all have a stake in the viability and purity of seed. Differences among viability estimates affect the price and profitability of seed lots, the design of seed mixes, and the establishment of plantings. Reliable purity estimates are important for avoiding the introduction of new weed species and defending the reputation of conservation plantings. **A research project to characterize the variability in native seed testing within and across seed labs could help to inform policy.**

Changes to viability test requirements and the bid letting process could improve the availability of high quality, affordable seed. Accepting TZ tests for Pure Live Seed determination instead of germination+TZ would reduce the turnaround time for most tests of native species, enabling more growers to compete for bids. Extending the bidding window somewhat would also encourage participation and competition.

The Iowa DOT places a high value on geographic source and preferences source-identified yellow tag seed in its bids. The ICIA provides third party assurance that yellow tag seed originates from a known geographic source within Iowa. Relatively consistent DOT demand for yellow tag seed helped to grow the amount and diversity of Iowa-source seed produced in Iowa and neighboring states. However, the number of participating growers in the yellow tag program, the amount of seed labeled as yellow tag, and consumer demand have not grown enough to support the program. **The amount of seed marketed as yellow tag, and demand for it, could be increased if seed mixes were yellow-tagged or labeled with the percent of yellow tag included in the mix.** Whether or not labeling of mixes could fit the requirements of the yellow tag program is an unanswered question.

Government agencies beyond the DOT should consider ways to make the purchase of yellow tag seed for conservation plantings financially feasible for landowners. CRP participants and other native seed consumers benefit from having access to Iowa-source seed, but they may not be aware of its value. Meeting participants suggested that we look for answers to these questions: How can we make the case for using yellow tag seed in more applications, beyond roadsides? How can we increase the amount of

yellow tag eligible seed that is sold with a yellow tag? What motivates seed consumers? What kind of marketing, promotion, and/or education would be effective?

Modeling the native seed supply chain

Improving the seed supply chain model helped in clarifying supply-demand relationships and identifying areas where better information and coordination is needed (Appendix B). Discussion of the supply chain model at this meeting led to suggestions for research to better understand the motivations of native seed consumers. Continuing to refine the model will help in communicating the results of this meeting to stakeholders who were not present. It can serve as a framework for discussions of new questions such as: How will the large number of anticipated CRP re-enrollments in 2026 affect the native seed supply chain?

Evaluation Surveys

Out of 46 attendees, 36 (78%) returned evaluation surveys at the end of the meeting.

Rating Scale Questions

- All respondents either agreed or strongly agreed that the meeting topics were relevant to them.
- Most respondents agreed or strongly agreed that the meeting objectives were clear (89%) and the meeting structure was efficient (97%).
- Only 58% of respondents thought that there was enough time allotted for the panel and breakout discussions.
- Nearly 40% of respondents were neutral regarding “significant progress made toward meeting objectives.” This suggests that the objectives were more ambitious than the allotted time allowed.

Free Response Questions

When asked what they valued most about the meeting, the most common responses included communication and open discussion, the convening of people with diverse perspectives, and opportunities for networking and making new connections.

The most common suggestions for improvement were: 1) provide longer time for discussions and consider extending the meeting to more than one day, 2) provide opportunities for individuals to attend more than one breakout session, 3) improve moderation of large group discussions so that more issues can be addressed and more viewpoints heard, and 4) host similar meetings at least annually.

Suggested topics for future meetings and/or follow-up work included the following (in approximate order of interest level):

1. Production-related topics (BMPs, conservative species, planting density, crop rotation, etc.),
2. Yellow tag program (understanding/defining, improving, marketing/promoting, expanding beyond state lines) or exploring other ways to ensure geographic source,
3. Supply/demand dynamics of the native seed industry and influence of government policy and implementation by agencies,
4. Native plantings and prairie reconstruction (seed mixes, seeding practices, management, and evaluation/monitoring),
5. The business of native seeds (management, marketing, customer service, training new practitioners, and working with private landowners),
6. Understanding seed testing and how it affects the market,
7. Sharing outcomes of specific research

Appendix A – List of Meeting Attendees

First name	Last name	Business or Organization
Dan	Allen	Allendan Seed Company
Kevin	Andersen	Iowa DNR Wildlife Bureau
Seth	Appelgate	Iowa State University
Angela	Barker	Allendan Seed Company
Justin	Besco	Osenbaugh's Prairie Seed Farms
Jessica	Blake	Iowa State University Seed Lab
Jason	Bleich	Pheasants Forever & Quail Forever
James	Bottman	Iowa DOT
Bill	Buman	Backyard Designs
Chelsey	Buman	Backyard Designs
Jeff	Carstens	USDA Plant Introduction Station, Ames
Aaron	Corbin	Hoksey Native Seeds
James	Cronin	USDA-NRCS
Brian	Dose	The Prairie State Nursery, LLC
Pauline	Drobney	Neal Smith National Wildlife Refuge
Laura	Fischer Walter	Tallgrass Prairie Center, UNI, Plant Materials Program
Keith	Fredrick	Minnesota Native Landscapes
Stephanie	Frischie	Xerces Society for Invertebrate Conservation
Nathan	Gingerich	Applied Ecological Services/ Taylor Creek Restoration Nurseries
Seana	Godbold	Iowa DOT
Jacob	Groth	USDA-NRCS
Rick	Hellmich	USDA-ARS
Carroll	Hoksbergen	Hoksey Native Seeds
Ben	Hoskinson	Mahaska County IRVM
Karin	Jokela	Sogn Valley Farm
Laura	Jackson	Director, Tallgrass Prairie Center, UNI
Paul	Kinghorn	UNI Center for Business Growth & Innovation
Ashley	Kittle	Tallgrass Prairie Center, UNI, Prairie on Farms Program
Alan	Lange	USDA/NRCS
Christy	Long	Applied Ecological Services/ Taylor Creek Restoration Nurseries
Beth	Markhart	Prairie Restorations Inc.
Justin	Meissen	Tallgrass Prairie Center, UNI, Research and Restoration Program
Staci	Mueller	Tallgrass Prairie Center, UNI, Outreach Coordinator
Brent	Neighbor	City of Cedar Rapids
Kristine	Nemec	Tallgrass Prairie Center, UNI, IRVM Program
Sarah	Nizzi	Xerces Society
Matt	O'Connor	Pheasants Forever

John	Osenbaugh	Osenbaugh's Prairie Seed Farms
Charlie	Palmer	Osenbaugh's Prairie Seed Farms
Mark	Pingenot	Iowa DOT/ Living Roadway Trust Fund
Jacque	Pohl	Iowa State University
Jim	Rouse	Iowa Crop Improvement Assoc.
Julie	Schafer	Freedom Creek Prairie LLC
Rick	Schafer	Freedom Creek Prairie LLC
Ryan	Schmidt	Iowa Natural Heritage Foundation
Doan	Schmitz	Iowa Crop Improvement Assoc.
Roger	Schwery	Custom Seed Services
Matt	Sheaffer	Applied Ecological Services/ Taylor Creek Restoration Nurseries
Troy	Siefert	Iowa DOT/ Living Roadway Trust Fund
Jessi	Strinmoen	Shooting Star Native Seeds
John	Tyndall	Iowa State University
Mark	Udstuen	Shooting Star Native Seeds
Mary	Weld	Tallgrass Prairie Center, UNI, Grants and Programming

Appendix B – Updated Supply Chain Model

